Table 6-18
TRVs Selected for Benthic Invertebrate Tissue Assessment

Constituent	Units	Benthic Invertebrates - Tissue TRVs						
		NBSA BERA TRV			TRVs Developed Specifically for NBSA BERA	LPR FFS TRV (USEPA 2014)		
		NOAEL	LOAEL	Source		NOAEL	LOAEL	Source
Dioxins/Furans								
2,3,7,8-TCDD	mg/kg, ww	0.0003[a]	0.003	Crayfish; survival (Ashley et al. 1996)		0.00000015	0.0000013	Eastern oyster; reproduction (Wintermeyer and Cooper 2003)
Polychlorinated Biphenyls								
Total PCBs	mg/kg, ww	0.052[a]	0.52	10 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward Environmental LLC 2019)		0.0064	0.017	reproduction eastern oyster (Chu et al 2000; 2003)
Pesticides								
Total DDx (2,4 & 4,4)	mg/kg, ww	0.011[a]	0.11	6 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward Environmental LLC 2019)		0.06	0.13	Pink shrimp; mortality (Nimmo et al. 1970)
Total DDx (2,4 & 4,4) Alternative TRV	mg/kg, ww	0.001[a]	0.01	An alternative distribution (beta general) was selected to derive an alternative 5th percentile LOAEL TRV (10 µg/kg ww) as a conservative SSD-derived estimate. An alternative NOAEL (1.0 µg/kg ww) was extrapolated from the alternative 5th percentile LOAEL TRV using an uncertainty factor of 10.		--	--	--
Dieldrin	mg/kg, ww	0.008[a]	0.08	Pink shrimp; survival (Parrish et al. 1973)		0.0016	0.008	Pink shrimp; survival (Parrish et al. 1973)
Total Chlordane	mg/kg, ww	0.71	1.7	Pink shrimp; mortality (Parrish et al. 1976)	X	--	--	--
Hexachlorobenzene	mg/kg, ww	10.6	15.8	Amphipod; mortality (Nebeker et al. 1989)	X	--	--	--
Polycyclic Aromatic Hydrocarbons								
Total LMW PAH	mg/kg, ww	11[a]	111	Amphipod; mortality (Lee et al. 2002; fluorene study)		0.078	0.78	Polychaete worm; reproduction (Emery and Dillon 1996)
Total HMW PAH	mg/kg, ww	8.1	22.2	Amphipod; growth and reproduction (Schuler et al. 2007; fluoranthene study)		0.066	0.66	Blue mussel; reproduction (Eertman et al. 1995)
Inorganics								
Arsenic	mg/kg, ww	0.064[a]	0.64	7 species; survival and growth. SSD-derived 5th percentile value. (Windward Environmental LLC 2019)		--	--	--
Cadmium	mg/kg, ww	0.024[a]	0.24	29 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward Environmental LLC 2019)		--	--	--
Chromium	mg/kg, ww	1.5	3.5	Amphipod; survival and growth (Norwood et al. 2007)		--	--	--
Copper	mg/kg, ww	--	--	--		5	12	Baltic clam; survival (Absil et al. 1996)
Lead	mg/kg, ww	4[a]	40	Amphipod; survival (Spehar et al. 1978)		0.52	2.6	Amphipod (Hyallela); survival (Borgmann and Norwood 1999)
Mercury/Methylmercury	mg/kg, ww	0.048	0.095	Whole body copepod; reproduction (Hook and Fisher 2002)		0.048	0.095	Whole body copepod; reproduction (Hook and Fisher 2002)
Nickel	mg/kg, ww	0.1[a]	1.1	Amphipod; survival (Borgmann et al. 2001)				
Selenium	mg/kg, ww	0.05	0.51	Midge; growth (Malchow et al. 1995)		--	--	--
Silver	mg/kg, ww	0.49	0.59	Water flea; growth and reproduction (Naddy et al. 2007)		--	--	--
Zinc	mg/kg, ww	5.1[a]	51	Crustaceans; survival (Muyssen et al. 2006		--	--	--

Table 6-18
TRVs Selected for Benthic Invertebrate Tissue Assessment

Notes:
[a] NOAEL extrapolated from LOAEL using an uncertainty factor of 10.

Acronyms and Abbreviations:
"--" = not available
BERA = baseline ecological risk assessment
FFS = focused feasibility study
HMW = high molecular weight
LMW = low molecular weight
LOAEL = lowest observed adverse effects level
LPR = Lower Passaic River
mg/kg, ww = milligrams per kilogram, wet weight
NBSA = Newark Bay Study Area
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SSD = species sensitivity distribution
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

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Table 6-19a
Calculated Tissue HQs for Benthic Invertebrates with NBSA- and LPR FFS-Selected TRVs (NBSA-wide)

Constituent	Units	Benthic Invertebrate Tissue - HQs (NBSA-wide)											
		Polychaete Worm				Blue Crab				Softshell Clam			
		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ		NBSA TRV-based HQ		LPR FFS TRV-based HQ	
		NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Dioxins/Furans													
2,3,7,8-TCDD	unitless	0.04	0.004	**75**	**9**	0.08	0.008	**167**	**19**	0.02	0.002	**44**	**5**
Polychlorinated Biphenyls													
Total PCBs	unitless	**1**	0.1	**10**	**4**	**7**	0.7	**57**	**21**	**3**	0.3	**22**	**8**
Pesticides													
Total DDx (2,4 & 4,4)	unitless	0.4	0.04	0.07	0.03	**11**	**1**	**2**	0.9	**2**	0.2	0.4	0.2
Total DDx (2,4 & 4,4) Alternative TRV	unitless	**4**	0.4	NC	NC	**117**	**12**	NC	NC	**26**	**3**	NC	NC
Dieldrin	unitless	0.3	0.03	**1**	0.3	0.7	0.07	**4**	0.7	0.08	0.008	0.4	0.08
Total Chlordane	unitless	0.003	0.001	NC	NC	0.05	0.02	NC	NC	0.005	0.002	NC	NC
Hexachlorobenzene	unitless	0.00004	0.00002	NC	NC	0.0001	0.00007	NC	NC	0.00003	0.00002	NC	NC
Polycyclic Aromatic Hydrocarbons													
Total HMW PAH	unitless	0.006	0.002	0.8	0.08	0.005	0.002	0.6	0.06	0.05	0.02	**6**	0.6
Total LMW PAH	unitless	0.001	0.0001	0.2	0.02	0.006	0.0006	0.9	0.09	0.005	0.0005	0.8	0.08
Inorganics													
Arsenic	unitless	**43**	**4**	NC	NC	**41**	**4**	NC	NC	**92**	**9**	NC	NC
Cadmium	unitless	**4**	0.4	NC	NC	**15**	**1**	NC	NC	**9**	0.9	NC	NC
Chromium	unitless	0.4	0.2	NC	NC	0.2	0.08	NC	NC	**3**	**1**	NC	NC
Copper	unitless	NC	NC	0.4	0.2	NC	NC	**6**	**3**	NC	NC	**3**	**1**
Lead	unitless	0.2	0.02	**1**	0.3	0.3	0.03	**2**	0.5	**7**	0.7	**56**	**11**
Mercury	unitless	0.6	0.3	0.6	0.3	**3**	**1**	**3**	**1**	**4**	**2**	**4**	**2**
Methylmercury	unitless	0.08	0.04	0.08	0.04	**3**	**1**	**3**	**1**	0.9	0.4	0.9	0.4
Nickel	unitless	**5**	0.5	NC	NC	**3**	0.3	NC	NC	**28**	**3**	NC	NC
Selenium	unitless	**7**	0.7	NC	NC	**22**	**2**	NC	NC	**19**	**2**	NC	NC
Silver	unitless	0.08	0.06	NC	NC	**2**	**1**	NC	NC	0.9	0.7	NC	NC
Zinc	unitless	**7**	0.7	NC	NC	**8**	0.8	NC	NC	**9**	0.9	NC	NC

Table 6-19a
Calculated Tissue HQs for Benthic Invertebrates with NBSA- and LPR FFS-Selected TRVs (NBSA-wide)

Notes:
Shaded/bolded HQ values indicate an HQ greater than 1.
HQs are calculated using an exposure point concentration based on the 95 percent upper confidence limit, except in the following instances:
- If the number of detected samples or sample size was less than 6, the maximum detected concentration was used.
- If the number of detected samples was 0, the maximum non-detect concentration was used.

Acronyms and Abbreviations:
FFS = focused feasibility study (USEPA 2014)
HMW = high molecular weight
HQ = hazard quotient
LMW = low molecular weight
LOAEL = lowest observed adverse effect level
LPR = Lower Passaic River
NBSA = Newark Bay Study Area
NC = not calculated; TRV not available
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

References:
USEPA. 2014. Focused feasibility study report for the lower eight miles of the Lower Passaic River. The Louis Berger Group, Battelle, and HDR/HydroQual.

Table 7-5
TRVs for Fish Tissue Assessment

Constituent	Units	Fish - Tissue TRVs						
		NBSA BERA TRV			TRVs Developed Specifically for NBSA BERA	LPR FFS TRV (USEPA 2014)		
		NOAEL	LOAEL	Source		NOAEL	LOAEL	Source
Dioxins/Furans								
2,3,7,8-TCDD	mg/kg, ww	0.000012[a]	0.00012	7 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward Environmental LLC 2019)		0.00000089	0.0000018	Mummichog; prey capture behavior (Couillard et al. 2011)
Total Dioxin/Furan TEQ Fish	mg/kg, ww	0.000012[a]	0.00012	7 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward Environmental LLC 2019)		0.00000089	0.0000018	Mummichog; prey capture behavior (Couillard et al. 2011)
Total Dioxin/Furan TEQ Fish Alternative TRV	mg/kg, ww	0.0000023	0.000023	As an alternative, a 5th percentile LOAEL based on the beta general distribution (2.3E-05 mg/kg ww)—which most accurately predicts the lowest LOAEL but has a relatively poor visual and statistical fit to the empirical data (when compared with the other distributions noted above)—was selected as a conservative SSD-derived estimate. The alternative NOAEL TRV (2.3E-06 mg/kg ww) was extrapolated from the LOAEL TRV using an uncertainty factor of 10.		--	--	--
Polychlorinated Biphenyls								
Total PCBs	mg/kg, ww	0.38[a]	3.8	11 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward Environmental LLC 2019)		0.17	0.53	Atlantic salmon smolt seawater preference; behavior (Lerner et al. 2007)
Total PCB TEQ Fish	mg/kg, ww	0.000012[a]	0.00012	7 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward Environmental LLC 2019)		0.00000089	0.0000018	Mummichog; prey capture behavior (Couillard et al. 2011)
Total PCB TEQ Fish Alternative TRV	mg/kg, ww	0.0000023	0.000023	As an alternative, a 5th percentile LOAEL based on the beta general distribution (2.3E-05 mg/kg ww)—which most accurately predicts the lowest LOAEL but has a relatively poor visual and statistical fit to the empirical data (when compared with the other distributions noted above)—was selected as a conservative SSD-derived estimate. The alternative NOAEL TRV (2.3E-06 mg/kg ww) was extrapolated from the LOAEL TRV using an uncertainty factor of 10.		--	--	--
Total Dioxin/Furan/PCB TEQ Fish	mg/kg, ww	0.000012[a]	0.00012	7 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward Environmental LLC 2019)		0.00000089	0.0000018	Mummichog; prey capture behavior (Couillard et al. 2011)
Total Dioxin/Furan/PCB TEQ Fish Alternative TRV	mg/kg, ww	0.0000023	0.000023	As an alternative, a 5th percentile LOAEL based on the beta general distribution (2.3E-05 mg/kg ww)—which most accurately predicts the lowest LOAEL but has a relatively poor visual and statistical fit to the empirical data (when compared with the other distributions noted above)—was selected as a conservative SSD-derived estimate. The alternative NOAEL TRV (2.3E-06 mg/kg ww) was extrapolated from the LOAEL TRV using an uncertainty factor of 10.		--	--	--
Pesticides								
Total DDx (2,4 & 4,4)	mg/kg, ww	0.052[a]	0.52	7 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward Environmental LLC 2019)		0.078	0.39	9 species; growth, survival, reproduction, and behavior (Beckvar et al. 2005)
Dieldrin	mg/kg, ww	0.12	0.2	Rainbow trout; survival (Shubat and Curtis 1986)		0.008	0.04	Rainbow trout; survival (Shubat and Curtis 1986)
Total Chlordane	mg/kg, ww	1.66[a]	16.6	Pinfish; mortality (Parrish et al. 1976)	X	--	--	--
Hexachlorobenzene	mg/kg, ww	468	Not derived	Fathead minnow; mortality (Schuytema et al. 1990)	X	--	--	--

Table 7-5
TRVs for Fish Tissue Assessment

Constituent	Units	Fish - Tissue TRVs						
		NBSA BERA TRV			TRVs Developed Specifically for NBSA BERA	LPR FFS TRV (USEPA 2014)		
		NOAEL	LOAEL	Source		NOAEL	LOAEL	Source
Inorganics								
Arsenic	mg/kg, ww	1.3	2.5	Rainbow trout; growth (Erickson et al. 2011)		--	--	--
Chromium	mg/kg, ww	1.28	1.3	Chinook salmon; mortality (Farag et al. 2006)	X	--	--	--
Copper	mg/kg, ww	3.92	4.48	Rainbow trout; mortality (Mount et al. 1994)	X	0.32	1.5	Striped mullet; survival (Zyadah and Abdel-Baky 2000)
Lead	mg/kg, ww	2.5	4.0	Brook trout; growth (Holcombe et al. 1976)		0.4[a]	4.0	Brook trout; reproduction (Holcombe et al. 1976)
Mercury/Methylmercury	mg/kg, ww	0.035[a]	0.35	12 species; survival, growth, reproduction, and behavior. SSD-derived 5th percentile value. (Windward Environmental LLC 2019)		0.052	0.26	7 species; growth, survival, reproduction, and behavior (Beckvar et al. 2005)
Selenium	mg/kg, ww	N/A[b]	1.6	Bluegill, sunfish, fathead minnow; reproduction (Coyle et al. 1993; Hermanutz et al. 1992; Ogle and Knight 1989)		--	--	--
Silver	mg/kg, ww	0.11	0.24	Rainbow trout; growth (Guadagnolo et al. 2001)		--	--	--
Zinc	mg/kg, ww	287	403	Guppy; growth (Pearson 1981)		--	--	--

Notes

[a] NOAEL extrapolated from LOAEL using an uncertainty factor of 10.

[b] No NOAEL was selected because LOAEL based on ED10 value for the most sensitive species evaluated, below which adverse effects are not expected.

Acronyms and Abbreviations:

"--" = not available
BERA = baseline ecological risk assessment
FFS = focused feasibility study
LOAEL = lowest observed adverse effects level
LPR = Lower Passaic River
mg/kg, ww = milligrams per kilogram, wet weight
N/A = Not applicable; no NOAEL was selected because LOAEL based on ED10 value for the most sensitive species evaluated, below which adverse effects are not expected
NBSA = Newark Bay Study Area
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
SSD = species sensitivity distribution
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value

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Table 7-11
TRVs for Fish Dietary Assessment

Constituent[a,b]	Units	Fish - Dietary TRVs		TRVs Developed Specifically for NBSA BERA	Source
		NOAEL	LOAEL		
PAHs					
Total PAH	mg/kg bw/day	6.2	18		Chinook salmon (anadromous); growth (Meador et al. 2006)
Inorganics					
Arsenic	mg/kg bw/day	0.52	1.9	X	Striped bass (marine/anad; growth; Blazer et al. 1997)
Cadmium	mg/kg bw/day	0.001[c]	0.01		Rockfish (marine); growth (Kim et al. 2004); Kang et al. 2005)
Chromium	mg/kg bw/day	0.19	Not derived		Grey mullet (marine); growth (Walsh et al. 1994)
Copper	mg/kg bw/day	1	2		Rockfish (marine); growth (Kang et al. 2005)
Lead	mg/kg bw/day	12.6	Not derived	X	Rainbow trout (freshwater); growth (Mount et al. 1994)
Mercury/Methylmercury	mg/kg bw/day	0.00056[c]	0.0056		10 species; growth, reproduction, mortality, and behavior (Windward Environmental LLC 2019)
Nickel	mg/kg bw/day	0.14[c]	1.4		Indian carp (freshwater); growth (Javed 2013)
Selenium	mg/kg bw/day	0.011[c]	0.11		7 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward Environmental LLC 2019)
Silver	mg/kg bw/day	70	Not derived	X	Rainbow trout (freshwater; growth; Galvez and Wood 1999)
Zinc	mg/kg bw/day	19	38		Rainbow trout (freshwater); growth (Takeda and Shimma 1977)

Notes:
[a] Risk for fish evaluated for metals and PAHs only.
[b] The revised LPR FFS (USEPA 2014) for the lower eight miles of the Lower Passaic River did not include a fish dietary assessment.
[c] NOAEL extrapolated from LOAEL using an uncertainty factor of 10.

Acronyms and Abbreviations:
FFS = focused feasibility study
LOAEL = lowest observed adverse effects level
LPR = Lower Passaic River
mg/kg bw/day = milligrams per kilogram body weight per day
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
TRV = toxicity reference value

Table 7-11
TRVs for Fish Dietary Assessment

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Table 8-2
TRVs for Bird Dietary Assessment

Constituent	Units	Bird - Dietary TRVs						
		NBSA BERA TRV			TRVs Developed Specifically for NBSA BERA	LPR FFS TRV (USEPA 2014)		
		NOAEL	LOAEL	Source		NOAEL	LOAEL	Source
Dioxins/Furans								
2,3,7,8-TCDD	mg/kg bw/day	0.000014	1.4E-04	Ring-necked pheasant; mortality, growth, and reproduction (Nosek et al. 1992a)		0.0000028	0.000028	Ring-necked pheasant; mortality, growth, and reproduction (Nosek et al. 1992a, 1992b)
Total TEQ Bird	mg/kg bw/day	0.000014	0.00014	Ring-necked pheasant; mortality, growth, and reproduction (Nosek et al. 1992a)		0.0000028	0.000028	Ring-necked pheasant; mortality, growth, and reproduction (Nosek et al. 1992a, 1992b)
Polychlorinated Biphenyls								
Total PCBs	mg/kg bw/day	0.14[a]	1.4	Ringed turtle-dove; reproduction (Peakall et al. 1972; Peakall and Peakall 1973)		0.4	0.5	Chicken; reproduction (Chapman 2003)
Total PCB TEQ Bird	mg/kg bw/day	0.000014	0.00014	Ring-necked pheasant; mortality, growth, and reproduction (Nosek et al. 1992a)		0.0000028	0.000028	Ring-necked pheasant; mortality, growth, and reproduction (Nosek et al. 1992a, 1992b)
Total PCB Dioxin TEQ Bird	mg/kg bw/day	0.000014	0.00014	Ring-necked pheasant; mortality, growth, and reproduction (Nosek et al. 1992a)		0.0000028	0.000028	Ring-necked pheasant; mortality, growth, and reproduction (Nosek et al. 1992a, 1992b)
Pesticides								
Total DDx (2,4 & 4,4)	mg/kg bw/day	0.025[a]	0.25	10 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward Environmental LLC 2019)		0.009	0.027	Brown pelican; reproduction (Anderson et al. 1975)
Dieldrin	mg/kg bw/day	0.08	0.12	Quail; reproduction and mortality (DeWitt 1956)	X	0.054	0.18	Helmeted guinea fowl; survival (Wiese et al. 1969)
Total Chlordane	mg/kg bw/day	2[a]	20	Bobwhite: mortality (Hill et al. 1976; Heath et al. 1972)	X	--	--	--
Hexachlorobenzene	mg/kg bw/day	1.1	5	Japanese quail; mortality (Vos et al. 1971)	X	--	--	--
Polycyclic Aromatic Hydrocarbons								
Total HMW PAH	mg/kg bw/day	--	--	--		0.048	0.48	Pigeon; reproduction (Hough el al. 1993)
Total LMW PAH	mg/kg bw/day	--	--	--		0.67	6.7	Red-winged blackbird; survival (Schafer et al. 1983)
Total PAH	mg/kg bw/day	40	Not derived	Mallard; growth (Patton and Dieter 1980)		--	--	--
Inorganics								
Arsenic	mg/kg bw/day	10	40	Mallard; reproduction (Stanley et al. 1994)	X	--	--	--
Cadmium	mg/kg bw/day	0.4[a]	4	Japanese quail; growth (Richardson et al. 1974)		--	--	--
Chromium	mg/kg bw/day	10.5[a]	105	Chicken; survival and growth (Chung et al. 1985)		--	--	--
Copper	mg/kg bw/day	1.9[a]	19	Chicken; growth (Jensen and Maurice 1978)		2.3	4.7	Wild turkey; growth (Kashani et al. 1986)
Lead	mg/kg bw/day	5.5	28	Japanese quail; growth (Morgan et al. 1975)		0.19	1.9	Japanese quail; reproduction (Edens and Garlich 1983)
Mercury/Methylmercury	mg/kg bw/day	0.0096[a]	0.096	6 species; survival, growth, and reproduction. SSD-derived 5th percentile value. (Windward Environmental LLC 2019)		0.013	0.026	Mallard; reproduction (Heinz 1974, 1976, 1979)
Nickel	mg/kg bw/day	15	33	Chicken; growth (Weber and Reid 1968)		--	--	--
Selenium	mg/kg bw/day	0.42	0.82	Mallard; reproduction (Heinz et al. 1989)		--	--	--
Silver	mg/kg bw/day	9.86[a]	98.6	Mallard; mortality (Van Vleet 1977 as cited in USEPA 2006)	X	--	--	--
Zinc	mg/kg bw/day	82	124	Chicken; growth (Roberson and Schaible 1960)		--	--	--

Table 8-2
TRVs for Bird Dietary Assessment

Notes:
[a] NOAEL extrapolated from LOAEL using an uncertainty factor of 10.

Acronyms and Abbreviations:

BERA = baseline ecological risk assessment
COPEC = constituent of potential ecological concern
FFS = focused feasibility study
HMW = high molecular weight
LMW = low molecular weight
LPR = Lower Passaic River
LPRSA = Lower Passaic River Study Area
LOAEL = lowest observed adverse effects level
mg/kg bw/day = milligrams per kilogram of body weight per day
NBSA = Newark Bay Study Area
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SSD = species sensitivity distribution
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency
-- = not available

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Table 8-5
TRVs for Bird Egg Tissue Assessment

Constituent	Units	Bird - Egg TRVs					
		NBSA BERA TRV			LPR FFS TRV (USEPA 2014)		
		NOAEL	LOAEL	Source	NOAEL	LOAEL	Source
Dioxins/Furans							
2,3,7,8-TCDD	mg/kg, ww	0.000025[a]	0.00025	5 species; reproduction. SSD-derived 5th percentile value. (Windward Environmental LLC 2019)	0.000059	0.00015	Various species; reproduction (USEPA 2003)
Total Dioxin/Furan TEQ Bird	mg/kg, ww	0.000025[a]	0.00025	5 species; reproduction. SSD-derived 5th percentile value. (Windward Environmental LLC 2019)	0.000059	0.00015	Various species; reproduction (USEPA 2003)
Polychlorinated Biphenyls							
Total PCBs	mg/kg, ww	1.6[a]	16	Ringed turtle dove; reproduction (Peakall et al. 1972); Peakall and Peakall 1973)	0.7	1.3	Chicken; reproduction (Chapman 2003)
Total PCB TEQ Bird	mg/kg, ww	0.000025[a]	0.00025	5 species; reproduction. SSD-derived 5th percentile value. (Windward Environmental LLC 2019)	0.000059	0.00015	Various species; reproduction (USEPA 2003)
Total Dioxin/Furan/PCB TEQ Bird	mg/kg, ww	0.000025[a]	0.00025	5 species; reproduction. SSD-derived 5th percentile value. (Windward Environmental LLC 2019)	0.000059	0.00015	Various species; reproduction (USEPA 2003)
Pesticides							
Total DDx (2,4 & 4,4)	mg/kg, ww	0.41[a]	4.1	7 species; reproduction. SSD-derived 5th percentile value. (Windward Environmental LLC 2019)	0.5	3	Brown pelican; reproduction (Blus 1984)
Dieldrin	mg/kg, ww	0.3[a]	3	Pheasant; reproduction (Genelly and Rudd 1956)	0.2	8.1	Barn owl; reproduction (Mendenhall et al. 1983)
Inorganics							
Mercury/Methylmercury	mg/kg, ww	0.18[a]	1.8	Mallard; reproduction (Heinz 1979, Heinz and Hoffman 2003, Heinz 1974, 1976)	0.011	0.11	Carolina wren; 'Reproduction (Jackson 2011)

Table 8-5
TRVs for Bird Egg Tissue Assessment

Notes

[a] NOAEL extrapolated from LOAEL using an uncertainty factor of 10.

No bird egg TRVs were developed specifically for the NBSA BERA (Windward Environmental LLC 2019). All TRVs were selected from the LPRSA BERA or the LPR FFS (USEPA 2003).

Acronyms and Abbreviations:

BERA = baseline ecological risk assessment
FFS = focused feasibility study
LOAEL = lowest observed adverse effects level
LPR = Lower Passaic River
mg/kg, ww = milligrams per kilogram, wet weight
NBSA = Newark Bay Study Area
NOAEL = no observed adverse effect level
PCB = polychlorinated biphenyl
SSD = species sensitivity distribution
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency
-- = not available

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Table 9-3
TRVs for Mammal Dietary Assessment

Constituent	Units	Mammal - Dietary TRVs						
		NBSA BERA TRV			TRVs Developed Specifically for NBSA BERA	LPR FFS TRV (USEPA 2014)		
		NOAEL	LOAEL	Source		NOAEL	LOAEL	Source
Dioxins/Furans								
2,3,7,8-TCDD	mg/kg bw/day	0.0000026	0.0000088	Mink; reproduction (Hochstein et al. 2001)		0.00000008	0.0000022	Mink; reproduction (Tillitt et al. 1996)
Total Dioxin/Furan TEQ Mammal	mg/kg bw/day	0.0000026	0.0000088	Mink; reproduction (Hochstein et al. 2001)		0.00000008	0.0000022	Mink; reproduction (Tillitt et al. 1996)
Polychlorinated Biphenyls								
Total PCBs	mg/kg bw/day	0.08	0.10	Mink; reproduction (Chapman 2003)		0.069	0.082	Mink; reproduction (Chapman 2003)
Total PCB TEQ Mammal	mg/kg bw/day	0.0000026	0.0000088	Mink; reproduction (Hochstein et al. 2001)		0.00000008	0.0000022	Mink; reproduction (Tillitt et al. 1996)
Total Dioxin/Furan/PCB TEQ Mammal	mg/kg bw/day	0.0000026	0.0000088	Mink; reproduction (Hochstein et al. 2001)		0.00000008	0.0000022	Mink; reproduction (Tillitt et al. 1996)
Pesticides								
Total DDx (2,4 & 4,4)	mg/kg bw/day	0.13[a]	1.30	Mouse; reproduction (Ware and Good 1967)	X	0.8	4	Rat; reproduction (Fitzhugh 1948)
Dieldrin	mg/kg bw/day	0.02	0.03	Rat; reproduction (Harr et al. 1970)		0.015	0.03	Rat; reproduction (Harr et al. 1970)
Chlordane	mg/kg bw/day	2.1[a]	21	Rat; reproduction and growth (Narotsky and Kavlok 1995)	X	--	--	--
Hexachlorobenzene	mg/kg bw/day	0.013[a]	0.13	Mink; reproduction (Bleavins et al. 1984)	X	--	--	--
Polycyclic Aromatic Hydrocarbons								
Total HMW PAH	mg/kg bw/day	--	--	--		0.62	3.1	Mouse; survival (Culp et al. 1998)
Total LMW PAH	mg/kg bw/day	--	--	--		50	150	Rat; growth (Navarro et al. 1991)
Total PAH	mg/kg bw/day	0.615	3.07	Mouse; survival (Culp et al 1998 as cited in USEPA 2007c)	X	--	--	--
Inorganics								
Arsenic	mg/kg bw/day	2.6	5.4	Rat; growth (Byron et al. 1967)		--	--	--
Cadmium	mg/kg bw/day	3.5	13	Rat; growth (Machemer and Lorke 1981)		--	--	--
Chromium	mg/kg bw/day	0.96[a]	9.62	Mouse; reproduction (Zahid et al. 1990; cited in USEPA 2008)	X	--	--	--
Copper	mg/kg bw/day	18	26	Mink; reproduction (Aulerich et al. 1982)		3.4	6.8	Mink; reproduction (Aulerich et al. 1982; cited in USEPA 2007a)
Lead	mg/kg bw/day	11	90	Rat; growth (Azar et al. 1973)		0.71	7	Rat; reproduction (Grant et al. 1980; cited in USEPA 2005b)
Mercury/Methylmercury	mg/kg bw/day	0.16	0.25	Mink; growth/survival (Wobeser et al. 1976)		0.016	0.027	Mink; growth and survival (Wobeser et al. 1976; cited in USEPA 1995)
Nickel	mg/kg bw/day	40	80	Rat; reproduction (Ambrose et al. 1976)		--	--	--
Selenium	mg/kg bw/day	0.016[a]	0.16	Rat; growth (Behne et al. 1992)		--	--	--
Silver	mg/kg bw/day	18.8[a]	188	Rat; reproduction (Shavlovski et al. 1995; cited in USEPA 2006)	X	--	--	--
Zinc	mg/kg bw/day	160	320	Rat; reproduction (Schlicker and Cox 1968		--	--	--

Table 9-3
TRVs for Mammal Dietary Assessment

Notes:
[a] NOAEL extrapolated from LOAEL using an uncertainty factor of 10.

Acronyms and Abbreviations:
BERA = baseline ecological risk assessment
COPEC = constituent of potential ecological concern
FFS = focused feasibility study
HMW = high molecular weight
LMW = low molecular weight
LPR = Lower Passaic River
LPRSA = Lower Passaic River Study Area
LOAEL = lowest observed adverse effects level
mg/kg bw/day = milligrams per kilogram of body weight per day
NBSA = Newark Bay Study Area
NOAEL = no observed adverse effect level
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SSD = species sensitivity distribution
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and dichlorodiphenyltrichloroethane (DDT)
TRV = toxicity reference value
USEPA = U.S. Environmental Protection Agency
-- = not available

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Table 11-1a
Weight of Evidence Risk Summary for NBSA BERA

Receptor	Preliminary COC[a]	Primary LOE	Summary of LOE	Risk Conclusions	Risk Driver[b]
Assessment Endpoint: Survival, growth, and/or reproduction of benthic invertebrates					
Benthic Invertebrate Communities	see Table 11-1b for Sediment Quality Triad risk conclusions			Localized Risk per SQT	
Polychaete Worm	2,3,7,8-TCDD, Total PCBs, Arsenic	SQT	• Localized risk to benthic communities (see Table 11-1b for conclusions of SQT) • No effect on growth/survival in site-specific toxicity tests (Iannuzzi et al. 2008)	Localized Risk per SQT	
Softshell Clam	2,3,7,8-TCDD, Total PCBs	Tissue HQs	• LPR FFS HQs ≥ 1 • LPR FFS TRVs based on bivalve data • Site-specific study on eastern oyster indicates potential bivalve reproductive impairment (Wintermyer and Cooper 2003)	Possible	Yes
Softshell Clam	Arsenic, Lead	Tissue HQs	• High magnitude of the HQs ≥ 1 • High uncertainty with invertebrate tissue HQ approach	Possible	Yes
Softshell Clam	Mercury	Tissue HQs	• NBSA and LPR FFS HQs ≥ 1 in all scenarios • Low magnitude of the HQs ≥ 1 • Invertebrate tissue HQ approach for mercury/methylmercury less uncertain	Possible	Yes
Softshell Clam	Total HMW PAHs, Cadmium, Chromium, Copper, Nickel, Selenium, Silver, Zinc	Tissue HQs	• Low magnitude of the HQs ≥ 1 • High uncertainty with invertebrate tissue HQ approach • Selenium and silver present at concentrations near or below background	Unlikely	No
Blue Crab	2,3,7,8-TCDD, Total PCBs	Tissue HQs	• LPR FFS HQs ≥ 1 • High magnitude of the HQs ≥ 1 • LPR FFS TRVs based on bivalve data and considered uncertain for crabs	Possible	Yes
Blue Crab	Total DDx	Tissue HQs	• High magnitude of the HQs ≥ 1 based on alternate NBSA TRVs • High uncertainty with invertebrate tissue HQ approach	Possible	Yes
Blue Crab	Mercury, Methylmercury	Tissue HQs	• NBSA and LPR FFS HQs ≥ 1 in all scenarios • Low magnitude of the HQs ≥ 1 • Invertebrate tissue HQ approach for mercury/methylmercury less uncertain	Possible	Yes
Blue Crab	Dieldrin, Arsenic, Cadmium, Copper, Mercury, Methylmercury, Selenium, Silver	Tissue HQs	• Low magnitude of the HQs ≥ 1 • High uncertainty with invertebrate tissue HQ approach • Selenium and silver present at concentrations near or below background	Unlikely	No

Table 11-1a
Weight of Evidence Risk Summary for NBSA BERA

Receptor	Preliminary COC[a]	Primary LOE	Summary of LOE	Risk Conclusions	Risk Driver[b]
Assessment Endpoint: Survival, growth, and/or reproduction of fish					
Mummichog/Killifish	Dioxins/Furans and TEQ (2,3,7,8-TCDD, Total Dioxin/Furan TEQ Fish, PCB TEQ Fish, Dioxin/Furan/PCB TEQ Fish)	Tissue HQs	• LPR FFS WB tissue HQs > 10 • Alternate NBSA WB tissue HQs > 1 • NBSA WB tissue HQs < 1 • Egg HQs < 1 • Site-specific pathology data did not show abnormalities • Site-specific reproductive study indicates endocrine impariments. relative to populations that are not urban-adapted (Bugel et al. 2010, 2011, 2014)	Possible	Yes
Mummichog/Killifish	Total PCBs	Tissue HQs	• Tissue LOAEL HQs < 1 for most scenarios • Egg HQs < 1 • Low magnitude of the HQs ≥ 1 • Site-specific pathology data did not show abnormalities	Unlikely	No
Mummichog/Killifish	Total DDx (2,4 & 4,4)	Tissue HQs	• LOAEL HQs < 1 in most scenarios • Low magnitude of HQs ≥ 1 in Southwest Zone • Site-specific pathology data did not show abnormalities	Unlikely	No
Mummichog/Killifish	Cadmium	Tissue HQs	• Cadmium not detected in fish tissue • Low magnitude of dietary HQs ≥ 1 • Diet assumptions overestimate dietary exposure • Site-specific pathology data did not show abnormalities	Unlikely	No
Mummichog/Killifish	Copper	Background	• Tissue copper at/within background • Dietary HQs < 1 • Low magnitude of tissue HQs ≥ 1 • Diet assumptions overestimate dietary exposure • Site-specific pathology data did not show abnormalities	Unlikely	No
Mummichog/Killifish	Mercury, Methylmercury	Tissue HQs	• WB Tissue HQs < 1 • Dietary HQs < 1 in most scenarios • Low magnitude of dietary HQs ≥ 1 in Southwest Zone • Egg LOAEL HQs < 1 • Site-specific pathology data did not show abnormalities	Unlikely	No
Mummichog/Killifish	Silver	Background	• Tissue LOAEL HQs < 1 in most scenarios • Silver < background in sediment • Low magnitude of tissue HQs ≥ 1 in North Zone • Dietary LOAEL HQs < 1 • Low confidence in both tissue and dietary TRVs • Site-specific pathology data did not show abnormalities	Unlikely	No
American Eel	Dioxins/Furans and TEQ (2,3,7,8-TCDD, Total Dioxin/Furan TEQ Fish, Dioxin/Furan/PCB TEQ Fish)	Tissue HQs	• LPR FFS WB tissue HQs approaching 10 • NBSA WB tissue HQs < 1 • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Possible	Yes

Table 11-1a
Weight of Evidence Risk Summary for NBSA BERA

Receptor	Preliminary COC[a]	Primary LOE	Summary of LOE	Risk Conclusions	Risk Driver[b]
American Eel	Total PCBs	Tissue HQs	• NBSA WB tissue HQs < 1 • Low magnitude of the WB tissue HQs ≥ 1 based on LPR FFS TRVs • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
American Eel	Total DDx (2,4 & 4,4)	Tissue HQs	• NBSA WB tissue HQs < 1 • Low magnitude of the WB tissue HQs ≥ 1 based on LPR FFS TRVs in North Zone • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
American Eel	Cadmium	Tissue HQs	• Cadmium not detected in fish tissue • Low magnitude of dietary HQs ≥ 1 • Diet assumptions overestimate dietary exposure • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
American Eel	Copper	Dietary HQs	• Dietary HQs < 1 for all scenarios • Low magnitude of tissue HQs ≥ 1 in Southwest Zone • Diet assumptions overestimate dietary exposure • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
American Eel	Mercury/Methylmercury	Tissue HQs	• Tissue LOAEL HQs < 1 in most scenarios • Dietary LOAEL HQs < 1 in most scenarios • Low magnitude of LOAEL HQs ≥ 1 • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
American Eel	Selenium	Background	• Selenium < background in sediment • Tissue LOAEL HQs < 1 in most scenarios • Low magnitude of tissue HQs ≥ 1 in Southeast Zone • Dietary HQs < 1 • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikley	No

Table 11-1a
Weight of Evidence Risk Summary for NBSA BERA

Receptor	Preliminary COC[a]	Primary LOE	Summary of LOE	Risk Conclusions	Risk Driver[b]
Summer/Winter Flounder	Dioxins/Furans and TEQ (2,3,7,8-TCDD, Total Dioxin/Furan TEQ Fish, Dioxin/Furan/PCB TEQ Fish)	Tissue HQs	• LPR FFS WB tissue HQs approaching 10 • NBSA WB tissue HQs < 1 • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Possible	Yes
Summer/Winter Flounder	Total PCBs	Tissue HQs	• LOAEL HQs < 1 for most scenarios • Low magnitude of the HQs ≥ 1 in the North Zone • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
Summer/Winter Flounder	Cadmium	Tissue HQs	• Cadmium not detected in fish tissue • Low magnitude of dietary HQs ≥ 1 • Dietary HQs in Southwest Zone calculated using clam MDC • Diet assumptions overestimate dietary exposure • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
Summer/Winter Flounder	Copper	Dietary HQs	• Dietary HQs < 1 • WB tissue HQs < 1 in most scenarios • Low magnitude of tissue HQs ≥ 1 in North Zone • Diet assumptions overestimate dietary exposure • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
Summer/Winter Flounder	Mercury/Methylmercury	Tissue HQs	• Tissue LOAEL HQs < 1 • Low magnitude of dietary HQs ≥ 1 • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
White Perch	Dioxins/Furans and TEQ (2,3,7,8-TCDD, Total Dioxin/Furan TEQ Fish, Dioxin/Furan/PCB TEQ Fish)	Tissue HQs	• WB tissue LOAEL HQs ≥ 1 for most scenarios • WB tissue LPR FFS LOAEL HQs > 10 for all scenarios • Liver LOAEL HQs < 1 • Liver HQs superseded by WB tissue HQs • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Possible	Yes

Table 11-1a
Weight of Evidence Risk Summary for NBSA BERA

Receptor	Preliminary COC[a]	Primary LOE	Summary of LOE	Risk Conclusions	Risk Driver[b]
White Perch	Total PCB TEQ, Total PCBs	Tissue HQs	• WB tissue LOAEL HQs < 1 in most scenarios • Low magnitude of the WB tissue HQs ≥ 1 • Liver LOAEL HQs < 1 • Liver HQs superseded by WB tissue HQs • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
White Perch	Total DDx (2,4 & 4,4)	Tissue HQs	• WB tissue LOAEL HQs > 1 in most cases • Low magnitude of the tissue LOAEL HQ ≥ 1 • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Possible	Yes
White Perch	Arsenic, Zinc	Tissue HQs	• Tissue and dietary HQs < 1 • Low magnitude of the liver HQs ≥ 1 (arsenic) or based on unbounded NOAEL (zinc) • Liver HQs superseded by WB tissue HQs • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
White Perch	Cadmium	Tissue HQs	• Cadmium not detected in fish tissue • Low magnitude of dietary HQs ≥ 1 • Diet assumptions overestimate dietary exposure • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
White Perch	Chromium	Tissue HQs	• WB tissue and dietary HQs < 1 in most scenarios • Tissue and dietary TRVs conservative • Liver HQs superseded by WB tissue HQs • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
White Perch	Copper	Dietary HQs	• Dietary HQs < 1 • Low confidence in the tissue and dietary TRVs • Diet assumptions overestimate dietary exposure • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Uncertain	Uncertain

Table 11-1a
Weight of Evidence Risk Summary for NBSA BERA

Receptor	Preliminary COC[a]	Primary LOE	Summary of LOE	Risk Conclusions	Risk Driver[b]
White Perch	Mercury	Tissue HQs	• WB Tissue LOAEL HQs < 1 • Low magnitude of dietary HQs ≥ 1 • Liver HQs < 1 • Liver HQs superseded by WB tissue HQs • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
White Perch	Selenium, Silver	Background	• Selenium related to background conditions • Tissue and dietary HQs < 1 • Liver HQs ≥ 1 based on unbounded NOAEL • Liver HQs superseded by WB tissue HQs • Site-specific pathology data did not show abnormalities • Long-term fish community monitoring indicate no impairment relative to nearby regional locations	Unlikely	No
Assessment Endpoint: Survival, growth, and/or reproduction of birds					
Spotted sandpiper	Total Dioxin/Furan/PCB TEQ Bird, Total HMW PAH, Lead, Mercury	Dietary HQs	• LOAEL HQs < 1 for most scenarios • Low magnitude of HQs ≥ 1 • Diet and SUF assumptions likely overestimate risk • MDC used as EPC in some cases	Unlikely	No
Great blue heron	Total Dioxin/Furan/PCB TEQ Bird, Total PCB TEQ Bird, Total DDx (2,4 & 4,4), Mercury, Methylmercury	Dietary HQs	• LOAEL HQs < 1 for most scenarios • Low magnitude of HQs ≥ 1 • Diet and SUF assumptions likely overestimate risk • MDC used as EPC in some cases	Unlikely	No
Double-crested cormorant	Total Dioxin/Furan/PCB TEQ Bird, Total PCB TEQ Bird, Total PCBs	Site- and Species-Specific LOE	• Low magnitude of HQs ≥ 1 • NBSA and LPR FFS TRVs are conservative • Site-specific nesting, reproduction, and development study (Parsons 2003) did not show adverse effects	Unlikely	No
Double-crested cormorant	Total DDx (2,4 & 4,4)	Site-Specific LOE	• Low magnitude of dietary and egg HQs ≥ 1 • Site-specific nesting, reproduction, and development study (Parsons 2003) did not show adverse effects	Unlikely	No
Double-crested cormorant	Mercury, Methylmercury	Dietary HQs	• LOAEL HQs < 1 for most scenarios • Low magnitude of dietary and egg HQs ≥ 1 • Site-specific nesting, reproduction, and development study (Parsons 2003) did not show adverse effects	Unlikely	No

Table 11-1a
Weight of Evidence Risk Summary for NBSA BERA

Receptor	Preliminary COC[a]	Primary LOE	Summary of LOE	Risk Conclusions	Risk Driver[b]
Double-crested cormorant	Copper	Dietary HQs	• LOAEL HQs < 1 for most scenarios • Low magnitude of dietary HQs ≥ 1 • Site-specific nesting, reproduction, and development study (Parsons 2003) did not show adverse effects	Unlikely	No
Lesser scaup	Lead	Dietary HQs	• LOAEL HQs < 1 for most scenarios • Low magnitude of HQs ≥ 1 • EPCs for Southwest Zone calculated using clam MDCs	Unlikely	No
Assessment Endpoint: Survival, growth, and/or reproduction of mammals					
River Otter	2,3,7,8-TCDD, Total Dioxin/Furan TEQ , Dioxin/Furan/PCB TEQ, Total PCBs	Dietary HQs	• LOAEL HQs < 1 in most scenarios • Low magnitude of HQs ≥ 1 • SUF assumptions likely overestimate risk	Unlikely	No
Muskrat	Mercury	Dietary HQs	• LOAEL HQs < 1 in most scenarios • Low magnitude of HQs ≥ 1	Unlikely	No
Harbor Seal	None	Dietary HQs	• All HQs < 1	Not expected	No
Assessment Endpoint: Survival, growth, and/or reproduction of reptiles					
Diamondback terrapin	None	Qualitative Evaluation	• Exposures assumed to be similar to or less than for mammals in NBSA • Surface water quality acceptable • Quantitative assessment for some metals in LPRSA (Windward 2019) did not find unacceptable risk	Not expected	No

Table 11-1a
Weight of Evidence Risk Summary for NBSA BERA

Notes:

[a] Preliminary COCs are identified as COPECs/receptors with a LOAEL HQ greater than or equal to 1 for any exposure areas or evaluation scenarios.

[b] Risk Drivers identified based on LOAEL HQs ≥ 1 and supporting LOEs.

Acronyms and Abbreviations:

BERA = Baseline Ecological Risk Assessment
COPEC = constituent of potential ecological concern
EPC = exposure point concentration
FFS = focused feasibility study
HQ = hazard quotient
LOAEL = lowest observed adverse effect limit
LOE = line of evidence
LPR = Lower Passaic River
MDC = maximum detected concentration
NOAEL = no observed adverse effect limit
NBSA = Newark Bay Study Area
PCB = polychlorinated biphenyl
SQT = sediment quality triad
SUF = site use factor
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
Total DDx = sum of dichlorodiphenyldichloroethylene, dichlorodiphenyldichloroethane, and dichlorodiphenyltrichloroethane
TRV = toxicity reference value
WB = whole-body
-- = not applicable

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